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10/516,454	12/03/2004	Toshio Okuhara	Q70518	2858

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EXAMINER

WITHERSPOON, SIKARL A

ART UNIT PAPER NUMBER

1621

DATE MAILED: 11/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.



## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-9, 14 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites a process for preparing an *aromatic compound* by reacting an *aromatic compound* with an ester; however, the claim does not recite what the aromatic compound(s) used as reactants is/are, and does not recite the name, or even general class of aromatic compound that is produced, thereby rendering the claim indefinite. The dependent claims listed in the rejection depend from claim 1, but do not clarify or remedy the deficiency.

### ***Claim Rejections - 35 USC § 102***

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 16 is rejected under 35 U.S.C. 102(a) as being anticipated by Burzynski et al (US 6,372,938).

If the product in the product-by-process claim is the same as or obvious from product or process of the prior art, the claim is unpatentable even though the prior

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product was made by a different process; *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Therefore, the compound, 4-phenylbutyric acid, disclosed by Burzynski et al anticipates the instant claim.

Claim 16 is rejected under 35 U.S.C. 102(b) as being anticipated by Izumi et al (Bull. Chem. Soc. Jpn., 1989).

The aromatic compound(s) made by the Friedel-Crafts alkylation or acylation process taught by the reference anticipate the instant claim. The biphenyl compound produced by the benzylation of benzene as disclosed in table 1 (p 2160) is one such aromatic compound.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burzynski et al and Izumi et al in combination.

The instant claims are drawn to a process for producing an aromatic compound by the Friedel-Crafts reaction of an aromatic compound with an ester in the presence of a heteropolyacid-containing, solid acid catalyst. Further limitations include the catalyst being supported on a carrier, and the ester compound comprising lactones.

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Burzynski et al teach a process wherein 4-phenylbutyric acid is prepared by reacting benzene with butyrolactone in the presence of a traditional Lewis acid catalyst, such as aluminum chloride (abstract).

The difference between Burzynski et al and the instant claims is that Burzynski et al do not employ a solid heteropolyacid as catalyst.

Izumi et al, on the other hand, teach silica-supported heteropolyacid catalysts for liquid phase Friedel-Crafts reactions, i.e., alkylation or acylation, using heteropolyacids such as 12-tungstophosphoric acid, molybdophosphoric acid, and tungstosilicic acid (abstract). The loading of the heteropolyacid(s) described is from 15-20 wt% (p 2160, 3<sup>rd</sup> paragraph). The surface area of the support material is more than 20 m<sup>2</sup>/g (p 2159, experimental section).

It therefore would have been obvious to a person of ordinary skill in the art, at the time the present invention was made, in view of the combined reference teachings, to substitute the Lewis acid catalyst, i.e., aluminum chloride, taught in the Burzynski et al reference, with the heteropolyacid(s) taught by Izuma et al. A person of ordinary skill would have been motivated to make such a substitution in Burzynski et al by the desire to replace such conventional catalysts as aluminum chloride that pose difficult operational problems of corrosion, removal of products, etc., in such Friedel-Crafts reactions, as suggested by Izuma et al (p 2159, 1<sup>st</sup> paragraph).

While Izuma et al do not expressly mention it, the examiner contends that it would also have been obvious to a person of ordinary skill to separate and recover the

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heteropolyacid catalyst, especially in processes conducted in a continuous manner, for purposes of economy in conducting such reactions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikarl A. Witherspoon whose telephone number is 571-272-0649. The examiner can normally be reached on M-F 8:30-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on 571-272-0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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**SIKARL A. WITHERSPOON**  
**PATENT EXAMINER**